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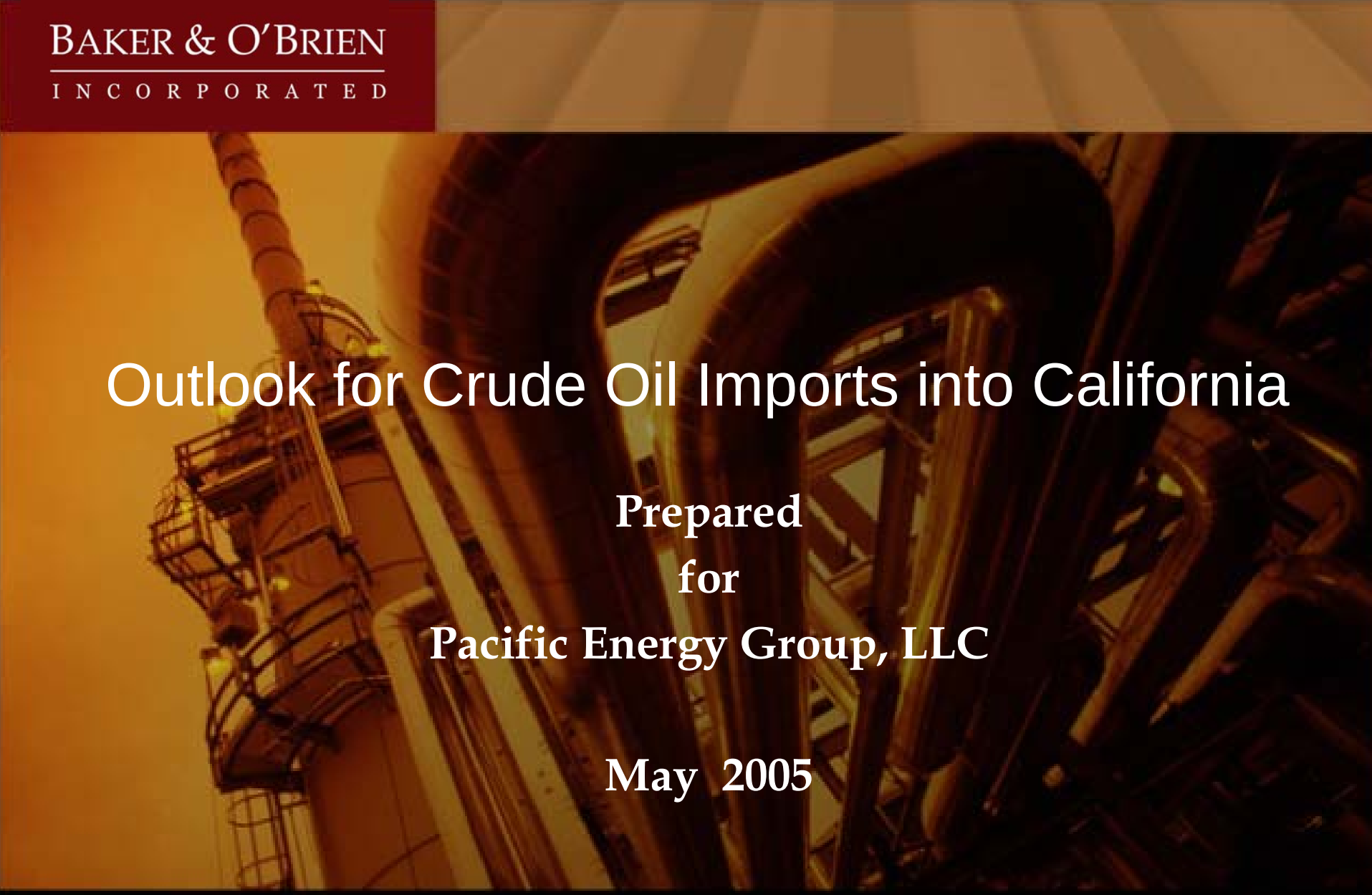


Outlook for Crude Oil Imports into California

Prepared
for
Pacific Energy Group, LLC

May 2005

Scope of Work

- **Historical (1995 - 2004) PADD 5 crude supply by source and disposition by area.**
  - ANS, California, and imported crudes.
  - Imports by source region.
  - By refinery for California.
- **15-Year projection (2005 - 2019) of PADD 5 crude supply by source and disposition by area.**
  - ANS, California, and imported crudes.
  - Imports by source region.
  - By refinery for California.

Scope of Work (continued)

- **Overview of potential impact of new automotive fuels and engines technologies on forecasted crude import requirements for California.**
- **Assessment of current and future capabilities of California refineries, with emphasis on Southern California, to process high naphthenic acid (TAN) crudes.**

Key Assumptions Used in Projections

ANS Crude Oil

- Current (2004) production of 938 MB/D will decline at an average of approximately 3% per year through 2019.
  - Consistent with the State of Alaska's current forecast.
  - 2004 to 2014: 1.8% per year decline.
  - 2014 to 2019: 5.5% per year decline.
- ANS is supplied preferentially to Alaska, Hawaii, and the Pacific Northwest first.
  - Most of Alaska's needs are inland and not accessible to imports.
  - Hawaii's needs are relatively small.
  - Difficult marine import logistics and calcined coke production in the Pacific Northwest.

Key Assumptions Used in Projections (continued)

- **ANS Crude Oil (continued)**
  - Balance goes to California with some preference given to Northern California.
    - Southern California refiners appear poised to be “weaned” away from ANS more rapidly.
  - Projections do not include potential ANWR volumes.
    - Not expected to start production for at least ten years after approval (2016 - if approved at the end of 2005).
    - Production expected to increase gradually over a five-year period to at most 350 MB/D.
    - Not likely to affect projections for Southern California use.

Key Assumptions Used in Projections (continued)

California Crude Oil

- Current (2004) production of 730 MB/D will decline at 3.5% per year through 2019.
  - Production declined approximately 4% in both 2003 and 2004 in a rising crude price environment.
- Crude is preferentially supplied to Bakersfield and Santa Maria area refineries first.
  - These areas do not have access to imports.
- Balance goes to Northern and Southern California with some preference given to the North.
  - Recognition of logistical difficulty of marine imports relative to Southern California.

Key Assumptions Used in Projections (continued)

Refinery Runs

- Increased by capacity creep and expected short-term capacity additions.
  - Capacity creep assumed to be 1.25% per year.
  - Expected capacity additions: 55 MB/D in Northern California (2006)
    50 MB/D in Southern California (2008)

Crude Oil Imports

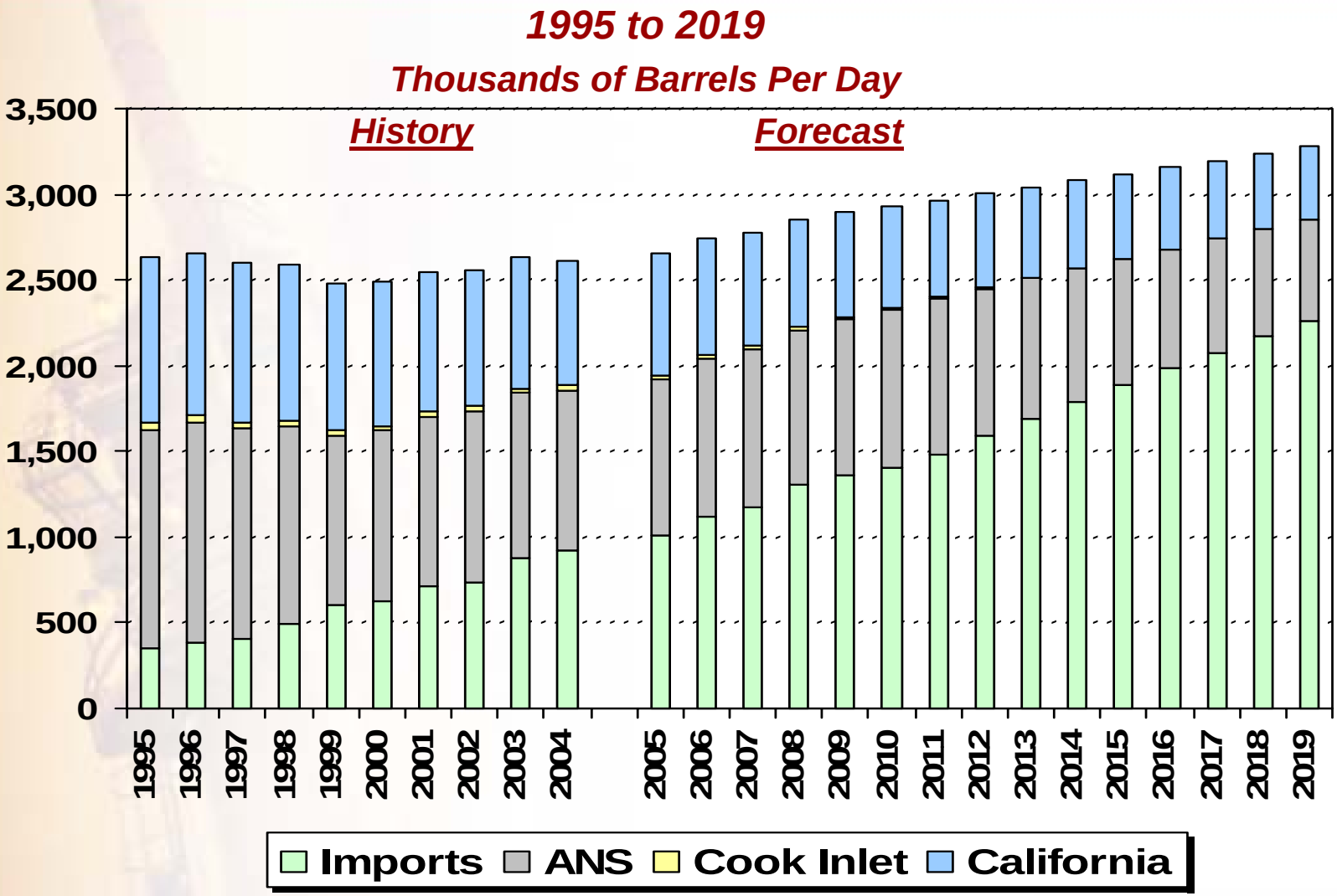
- Imports are currently sourced from the Middle East, Latin America, and West Africa, with some small volumes from the Pacific Rim and Canada.
- Current level and distribution of crude imports, escalated for capacity creep (1.25% per year), remains through projected period.

Key Assumptions Used in Projections (continued)

- Increasing shortfall of ANS and California crudes made up with additional imports.
  - ANS: Generally replaced by Middle East crudes.
  - California Crudes: Generally replaced by a combination of crudes from Latin America, West Africa, Canada, the Middle East, and the Pacific Rim.

- **Incremental Canadian imports will be high TAN, high sulfur, heavy oil sands based crude (Syn-Bit).**
  - Available starting in 2010.
  - Pipelined to deepwater port in Northern British Columbia.
  - 125 - 150 MB/D by 2019 - Southern California only.
- **Incremental West African imports will be high TAN, low sulfur, heavy crudes.**
  - 125 - 150 MB/D by 2019.

PADD 5 Crude Oil Supply



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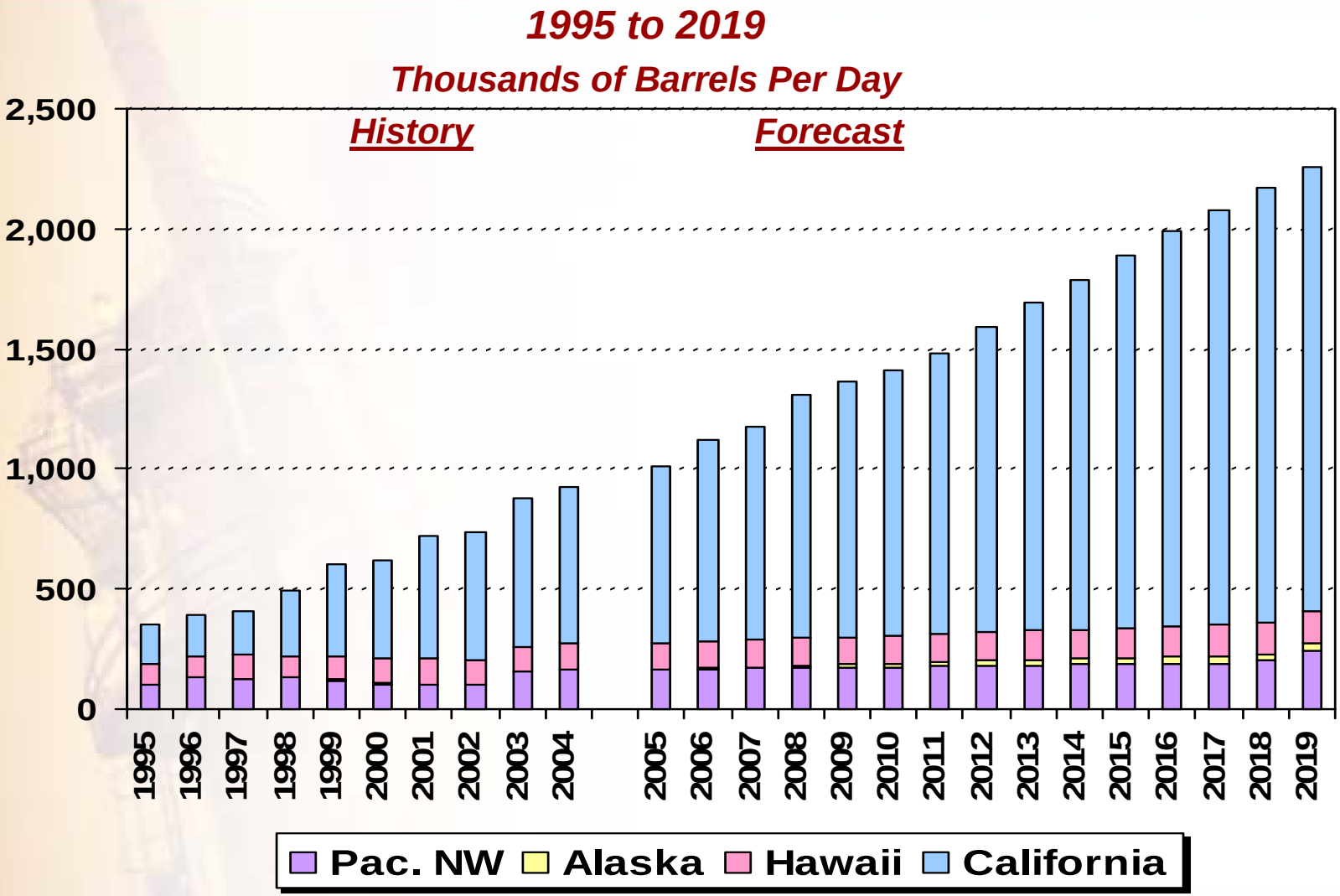
PADD 5 Imported Crude Oil Supply



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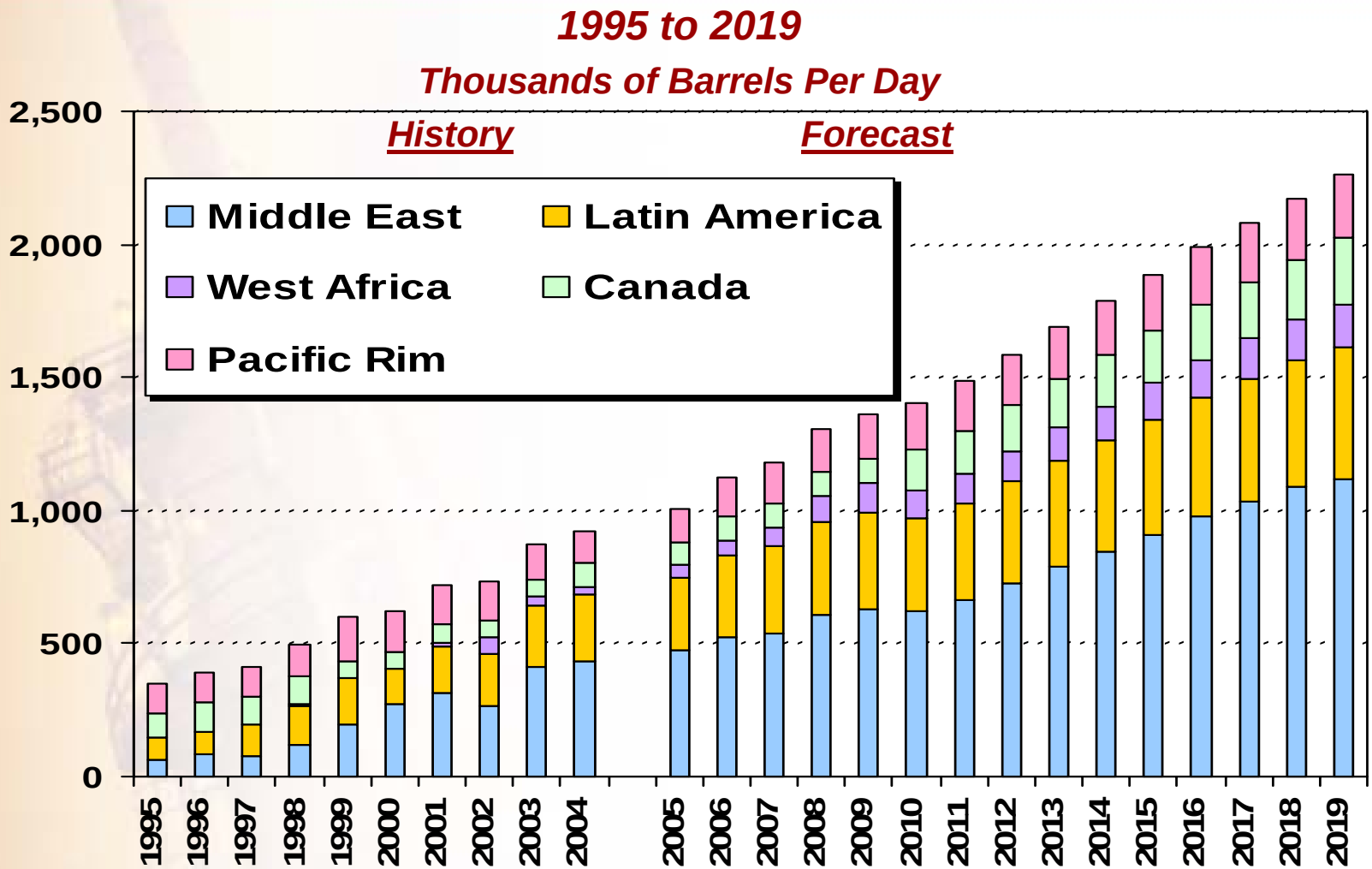
PADD 5 Imports By Source



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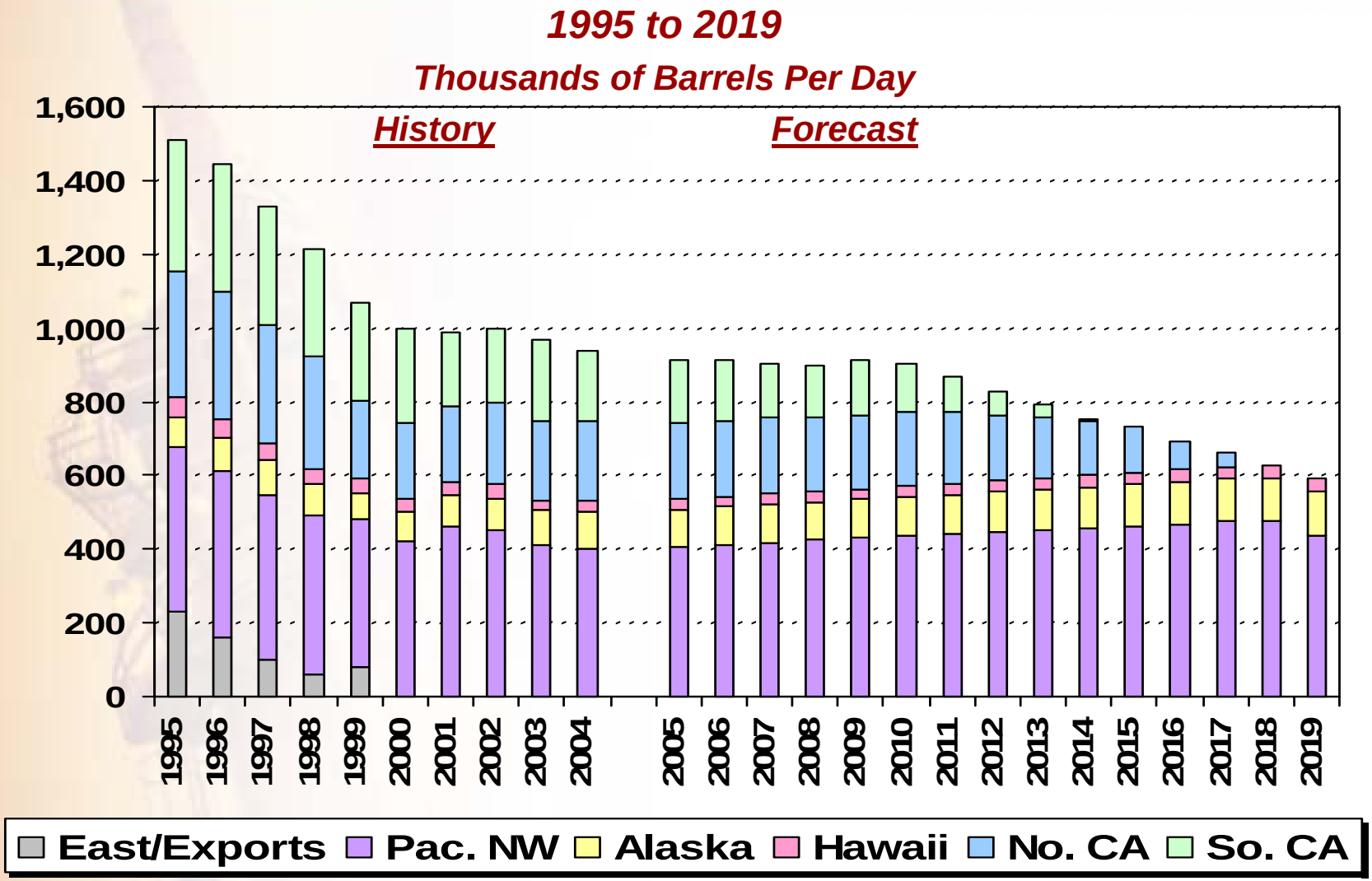
ANS Crude Oil Production & Disposition



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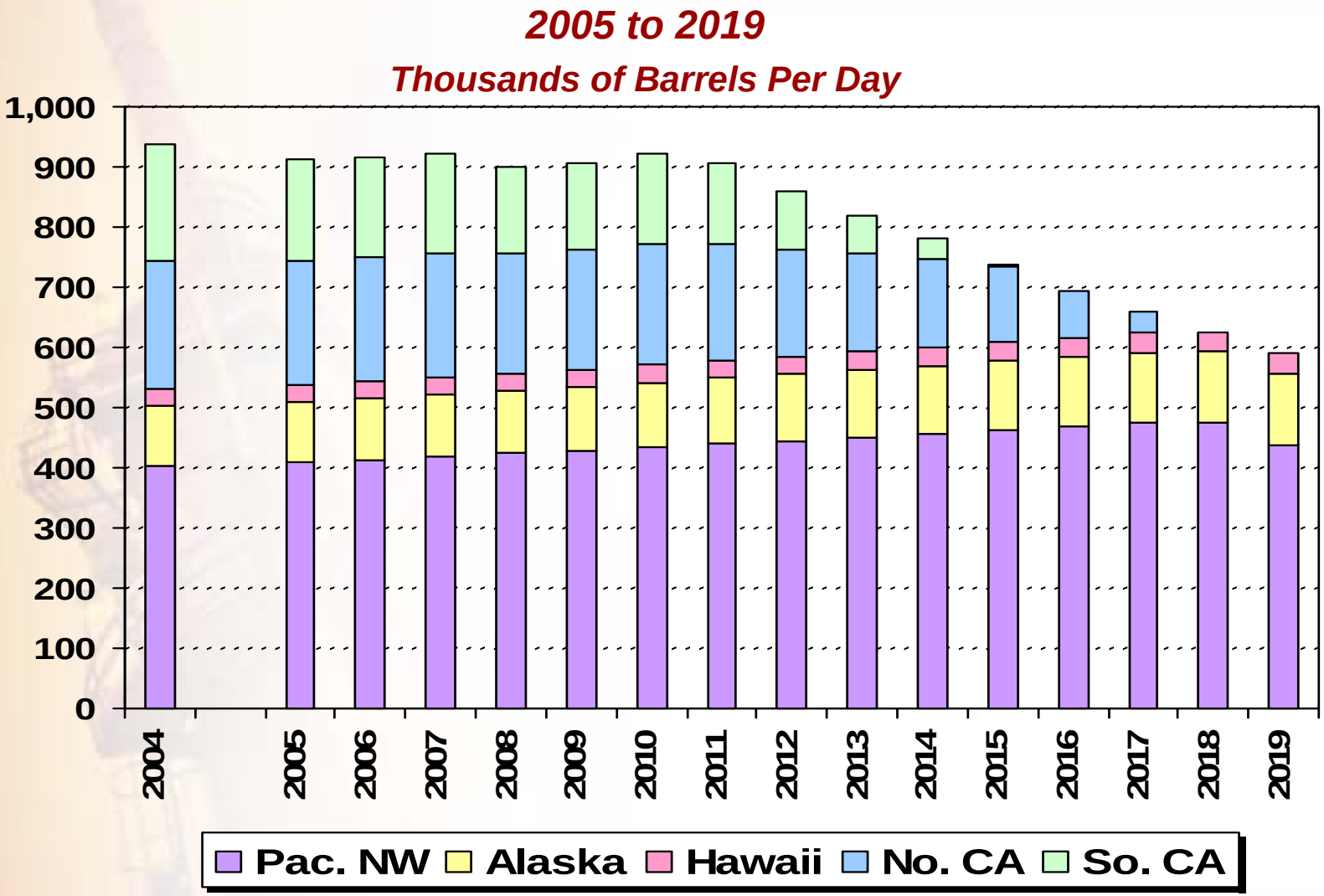
ANS Crude Oil Production & Disposition Forecast



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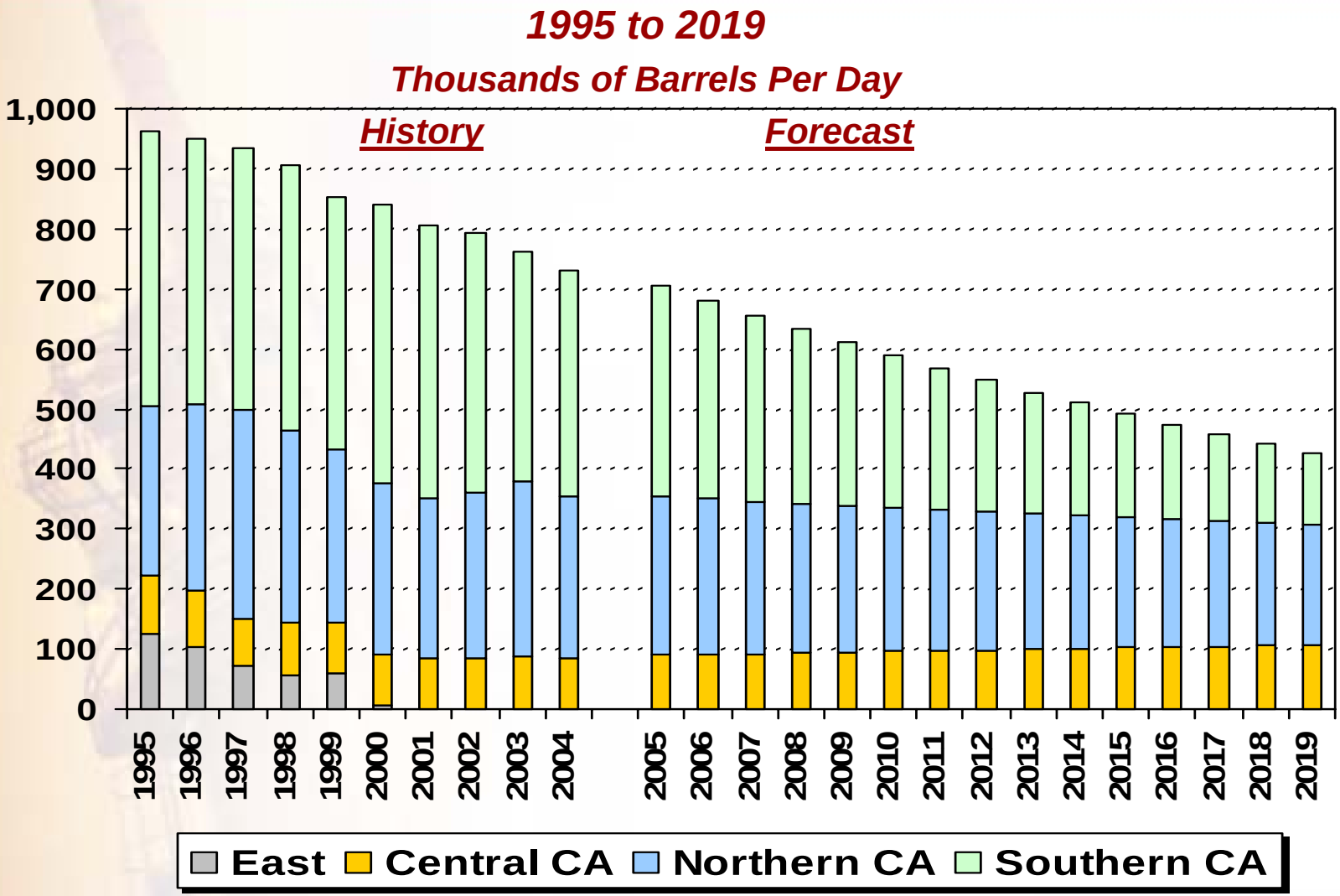
California Crude Oil Production & Disposition



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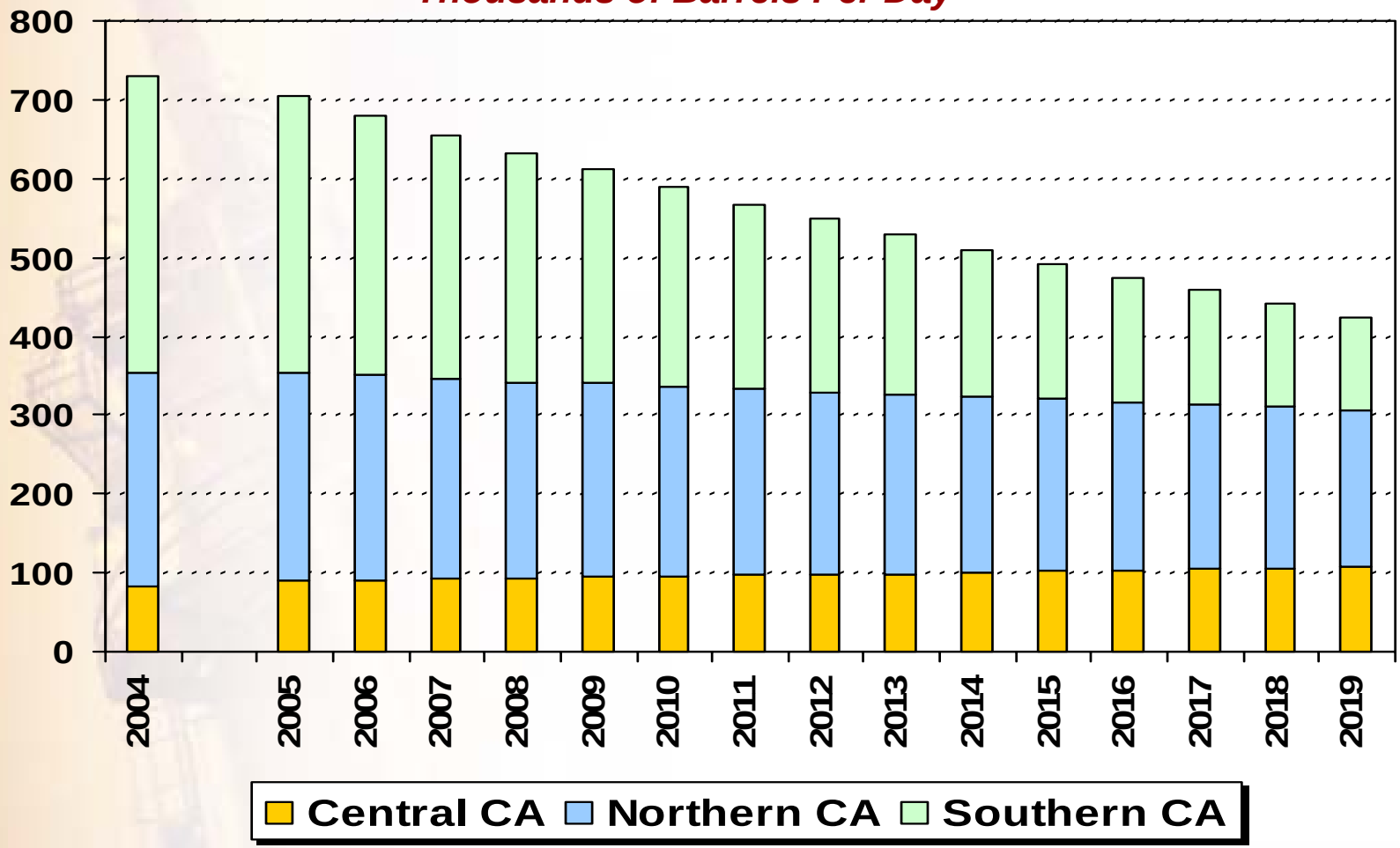
California Crude Oil Production & Disposition Forecast

2005 to 2019

Thousands of Barrels Per Day



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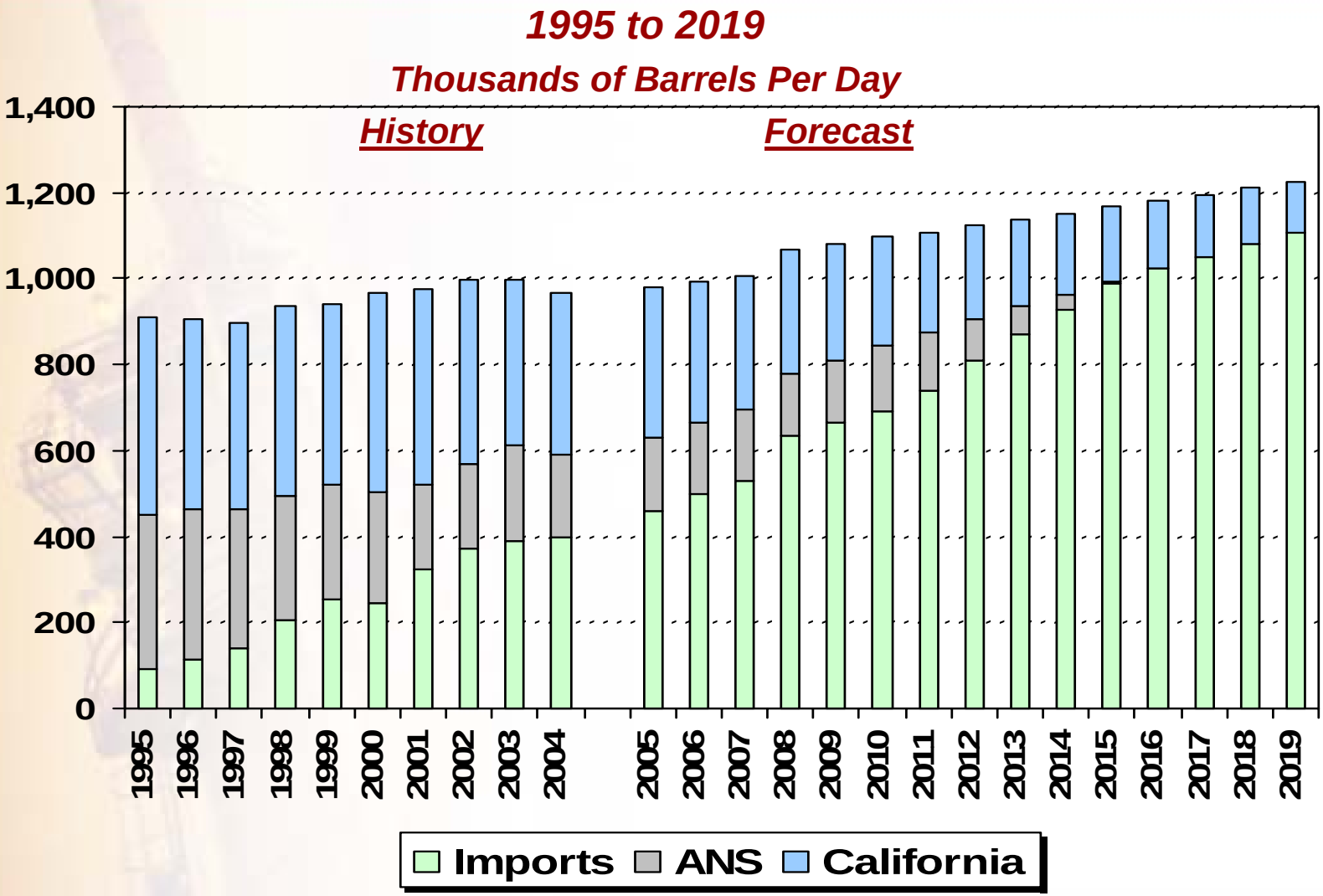
PADD 5 - Observations

- **Future crude supply will be increasingly dominated by imports. By the end of the forecast period (2019):**
  - Crude imports will be over 2.2 MMB/D (almost 70% of total crude runs) versus current level of about 0.9 MMB/D (about 35% of total crude runs).
  - The Middle East will be the primary source - about 50% of total crude imports.
  - California will be the largest user - over 80% of total crude imports.
- **ANS crude runs in California will be eliminated by 2018.**
- **California crude production will still be significant (over 400 MB/D) at the end of the forecast period.**

Southern California Crude Oil Supply



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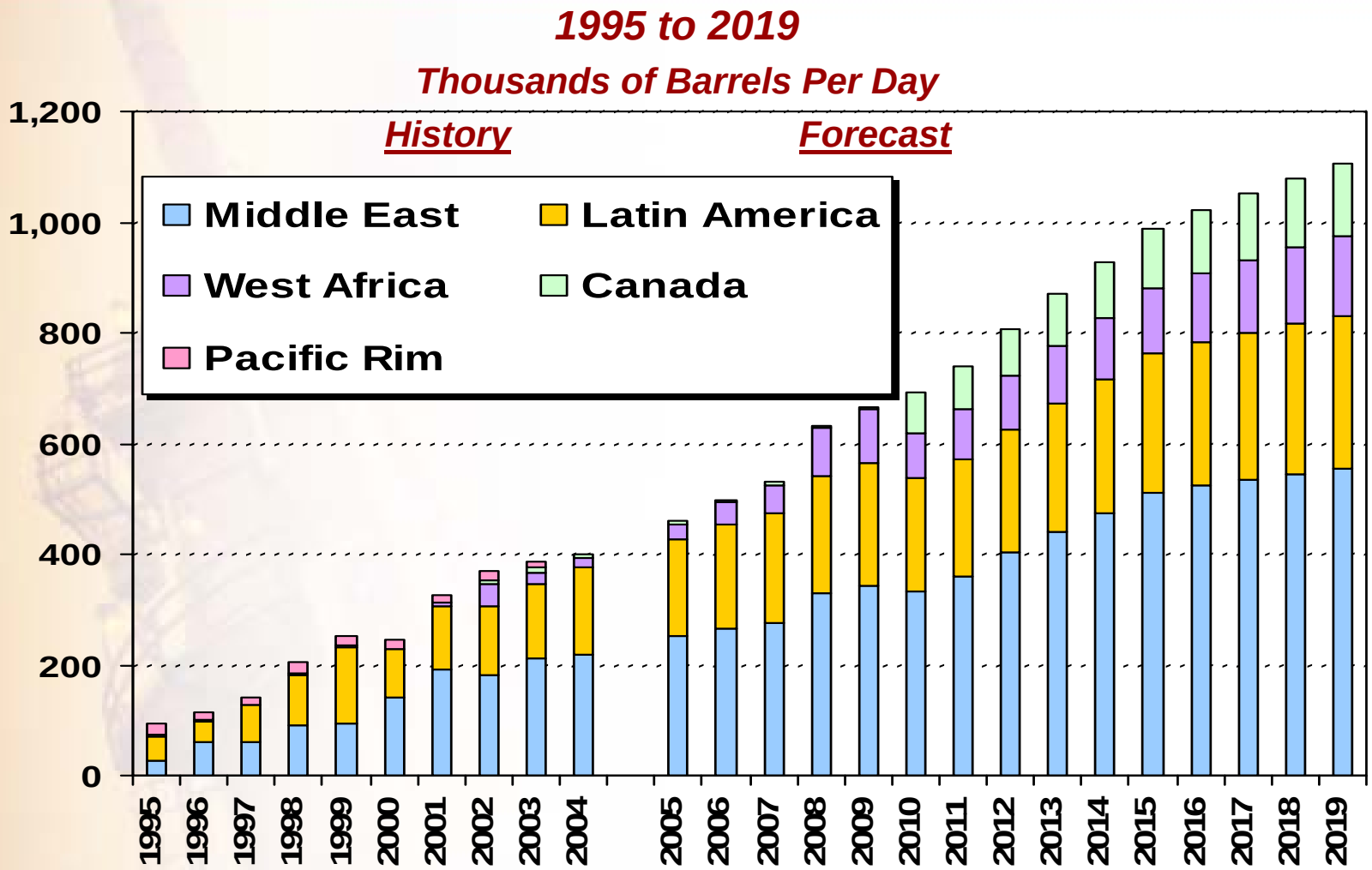
Southern California Imported Crude Oil Supply



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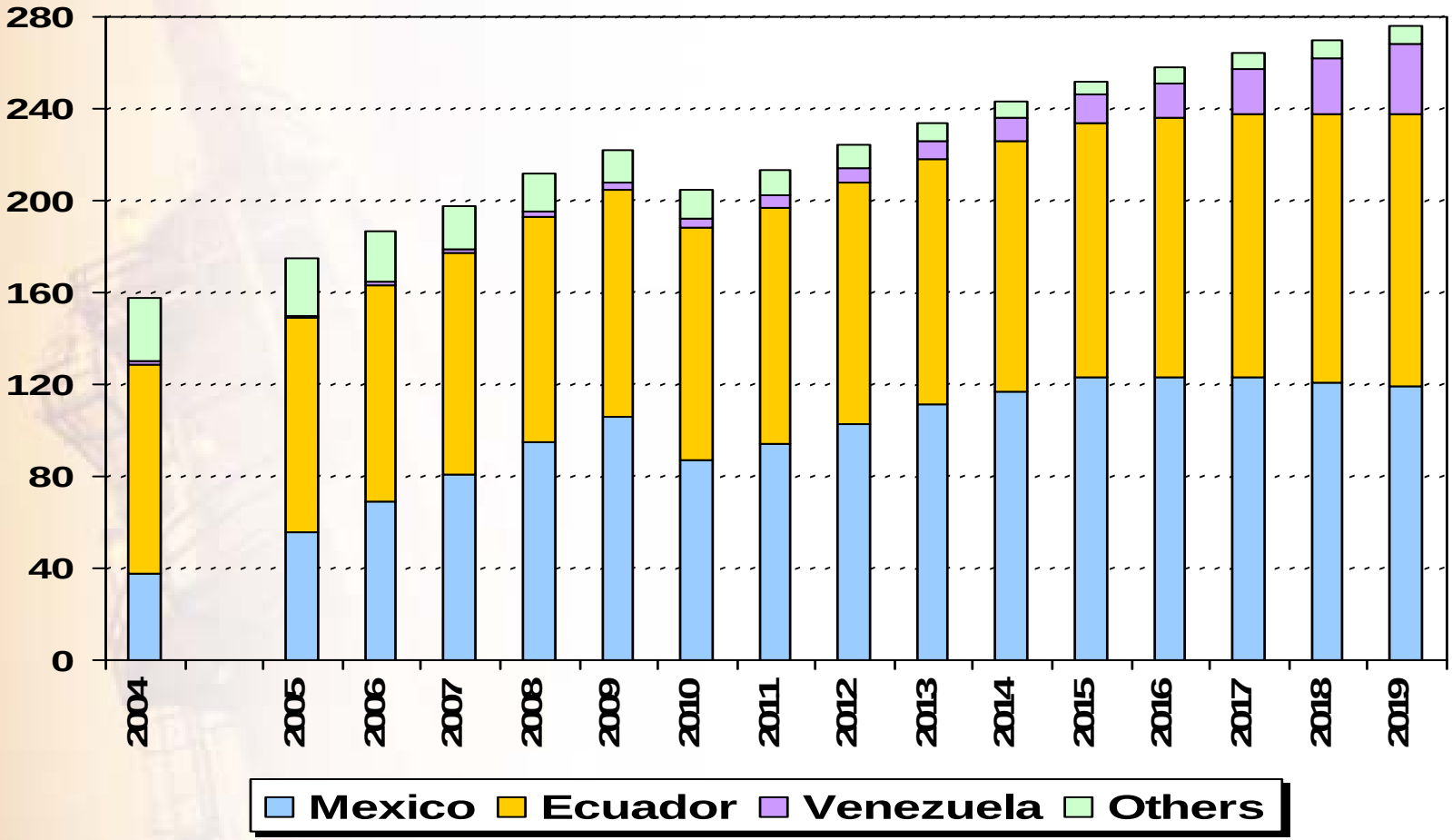
So. California - Latin America Crude Oil Import Mix Forecast

2005 to 2019

Thousands of Barrels Per Day



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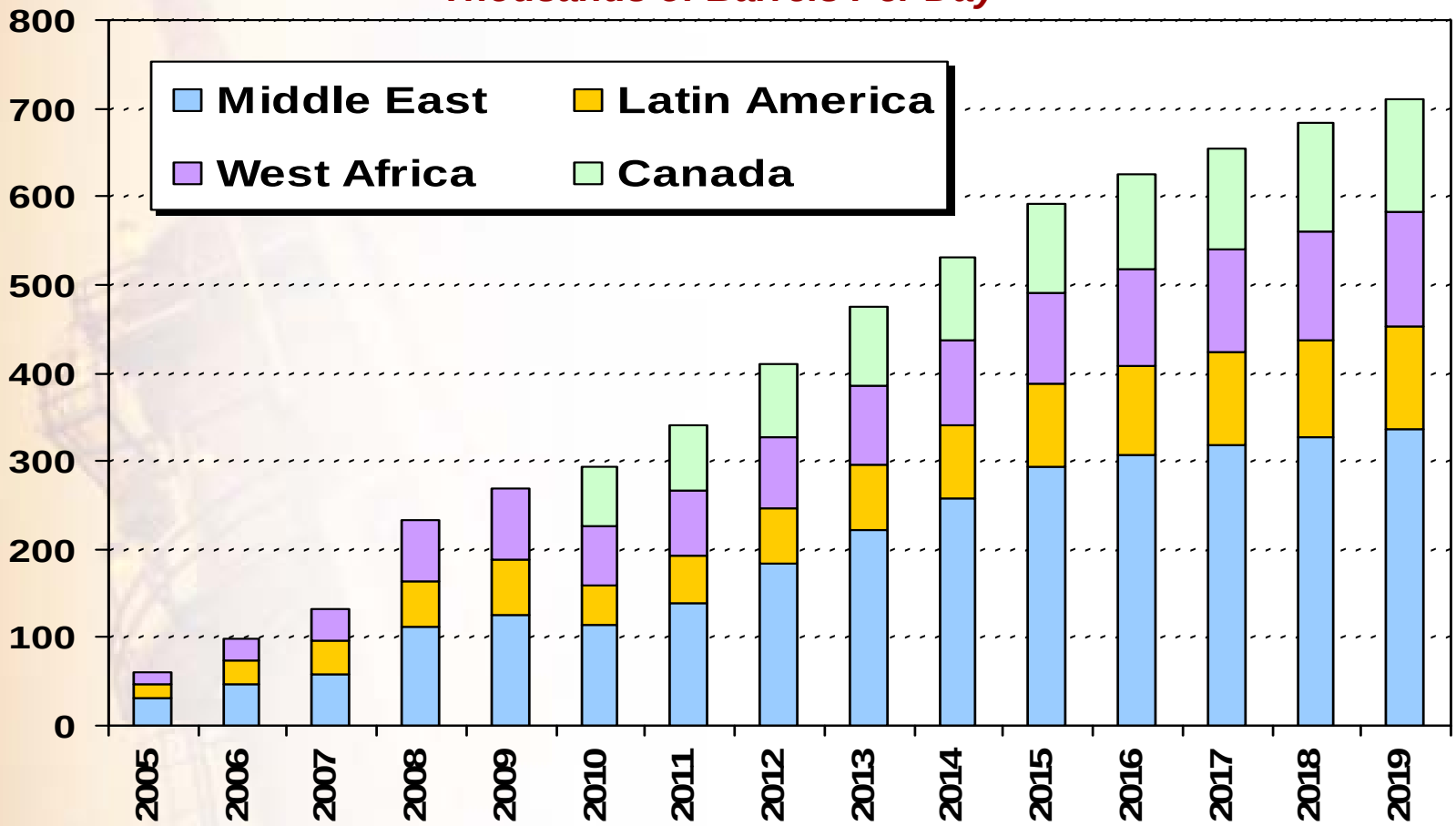
Southern California Incremental Crude Oil Imports

2005 to 2019 (Relative to 2004)

Thousands of Barrels Per Day



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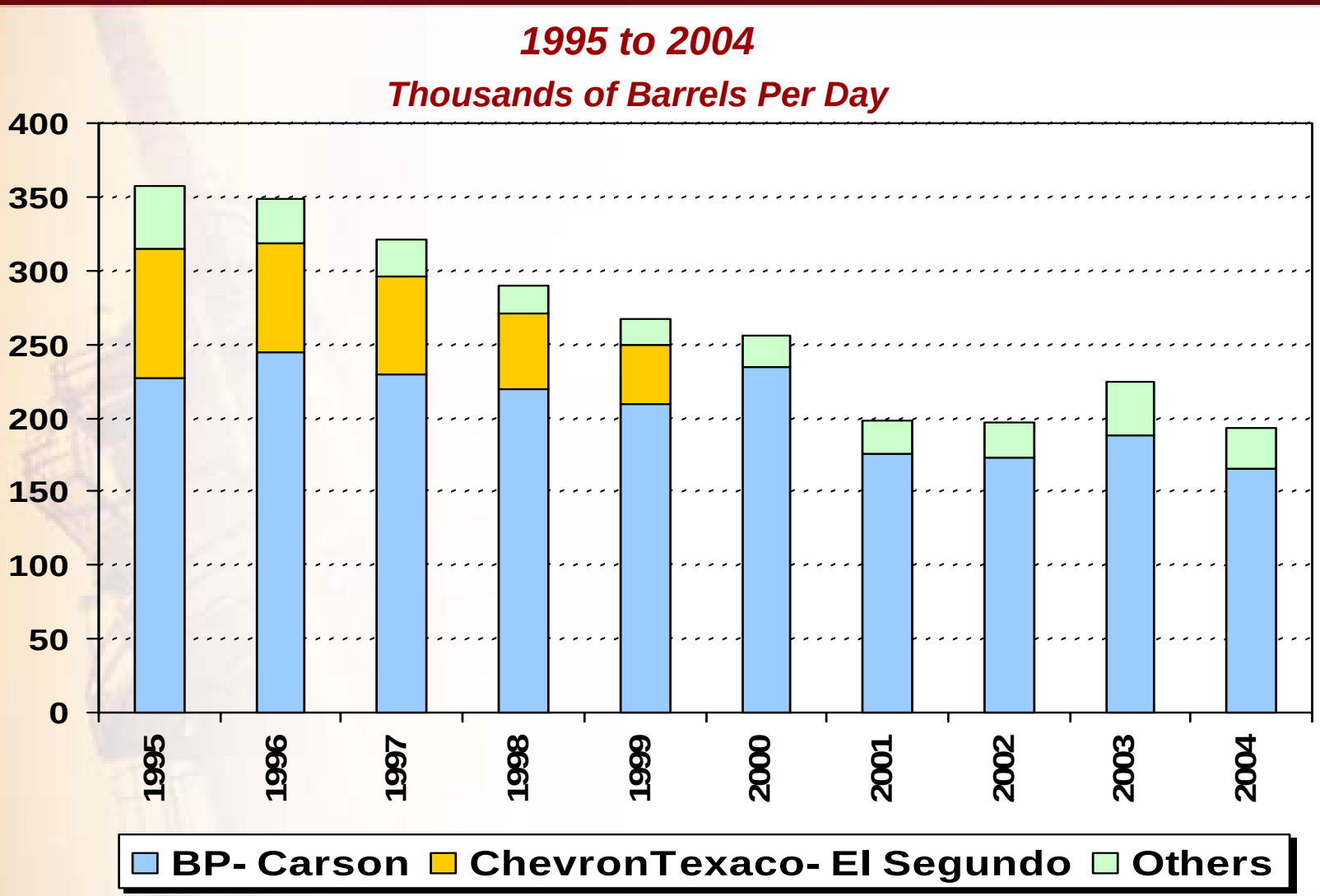
Southern California ANS Supply History



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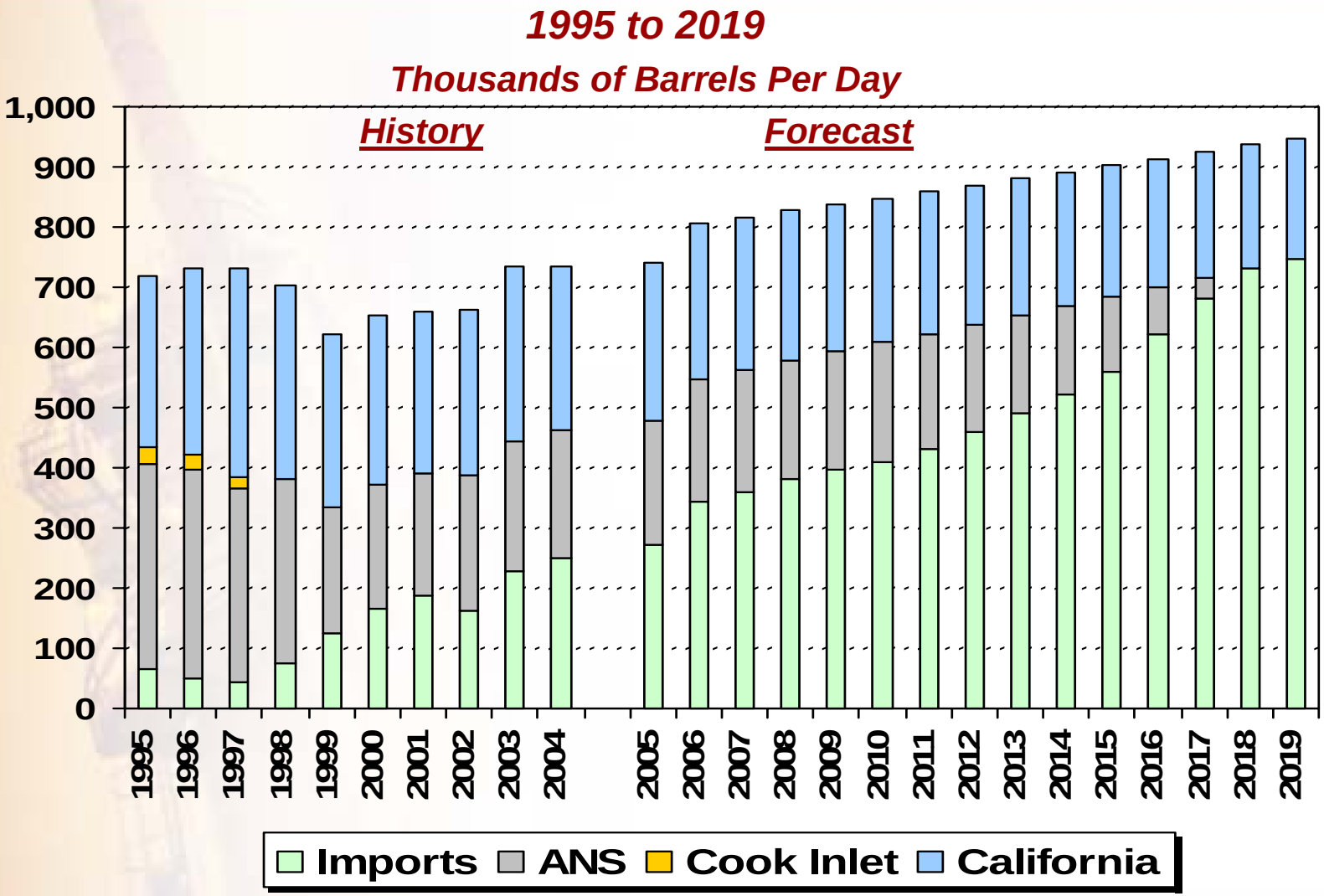
Southern California - Observations

- **Future Southern California crude supply will be increasingly dominated by imports. By the end of the forecast period (2019):**
  - Crude imports will be over 1.1 MMB/D (over 90% of total crude runs) versus current level of about 0.4 MMB/D (about 41% of total crude runs).
  - The Middle East will be the primary source of total crude imports.
    - About 550 MB/D or 50% of total crude imports.
  - Imports of "new" Canadian crude, starting in 2010, will increase to about 130 MB/D.
  - Imports of new West African crudes will increase from current low levels to about 140 MB/D.
  - Latin American imports will increase steadily to about 275 MB/D from the current level of 160 MB/D.
  - Imports from the Pacific Rim will be minimal.

Southern California - Observations (continued)

- **ANS use will decline steadily and be eliminated in 2016.**
  - BP is currently the dominant user - over 85% of 2004 total.
    - Share of ANS production declining faster than average.
    - Not a major future player in Alaskan oil exploration.
    - Southern California calcined coke business does not appear to be strategic (as opposed to the Pacific Northwest).
    - Will preferentially run its declining proprietary ANS at its Pacific Northwest refinery.
    - Will likely continue aggressive substitution with imports at its Carson refinery.
  - Other users can substitute easily.

Northern California Crude Oil Supply



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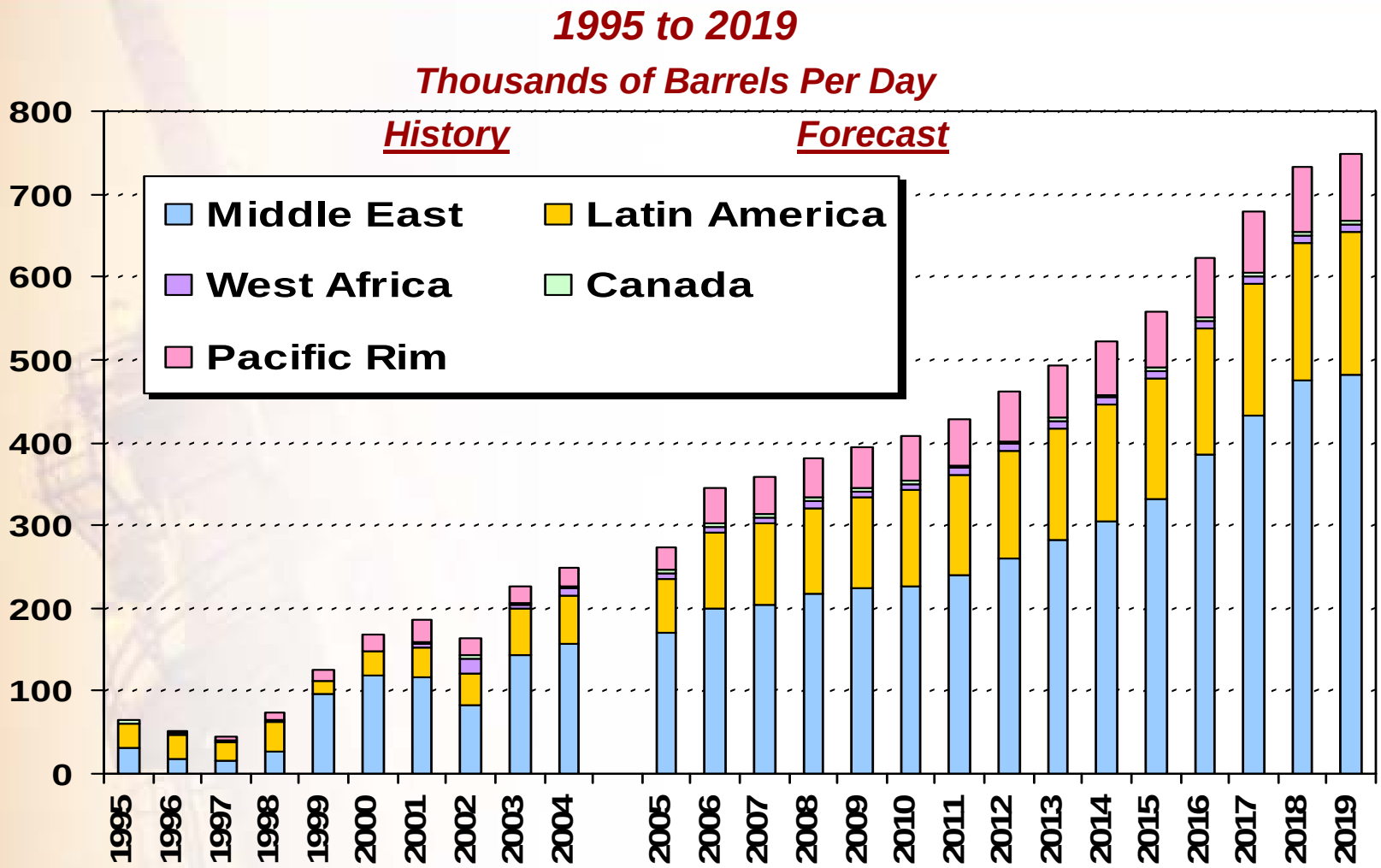
Northern California Imported Crude Oil Supply



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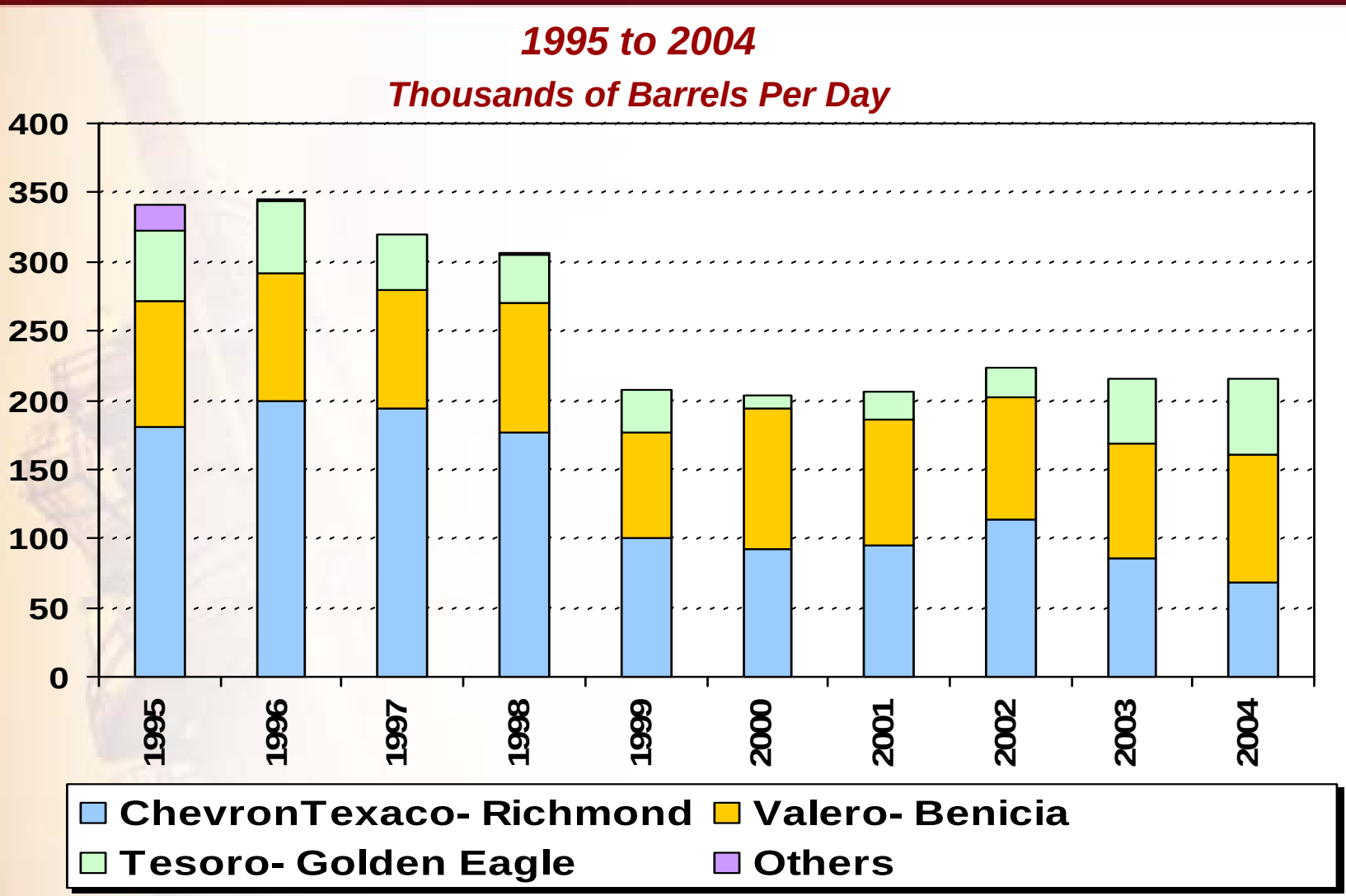
Northern California ANS Supply History



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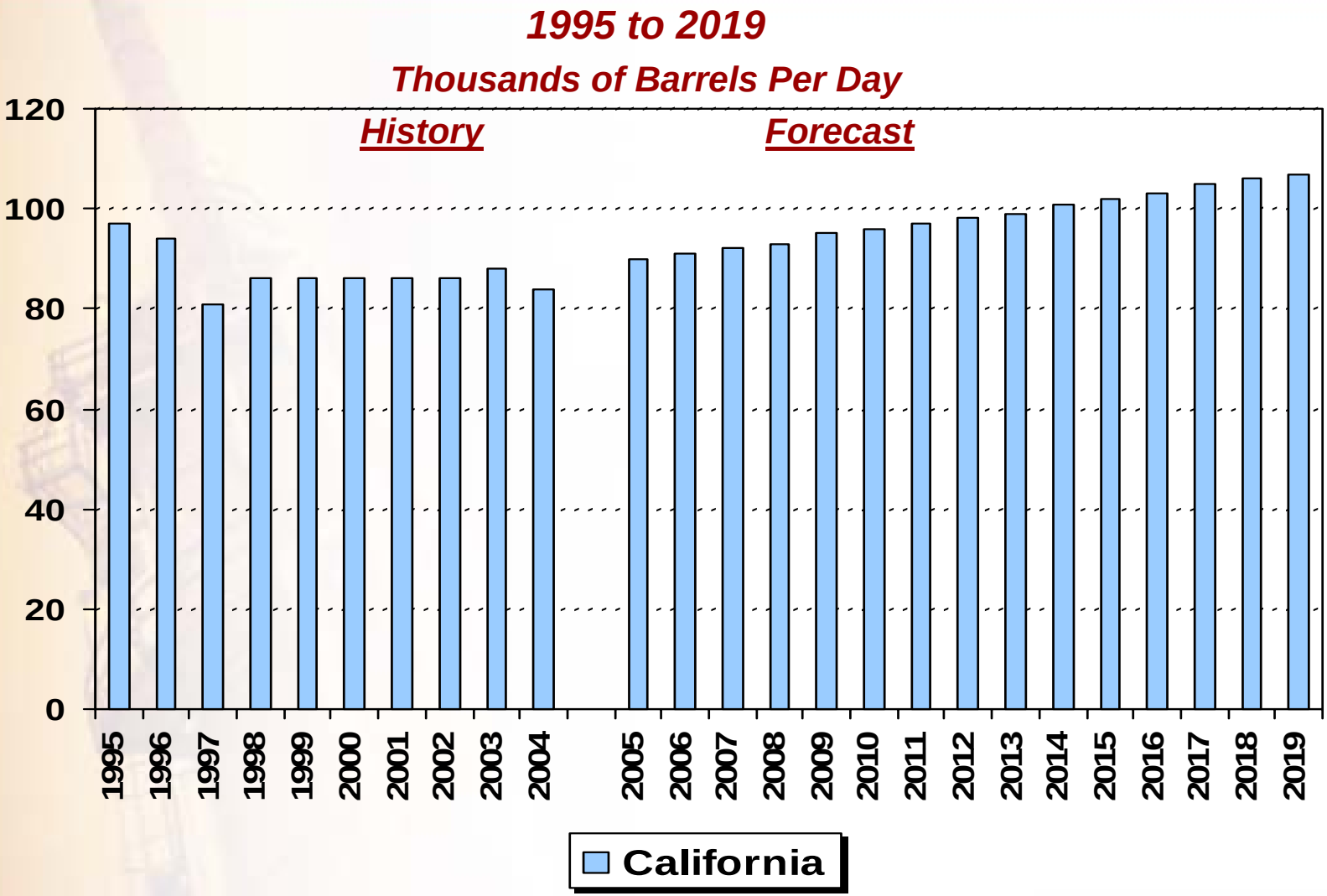
Northern California - Observations

- **Imports will represent almost 80% of crude runs in 2019.**
  - As with Southern California, the Middle East will be the primary source (about 65% of total imports).
  - Almost 60% of Middle East imports will be used by ChevronTexaco, Richmond.
  - Pacific Rim imports will increase significantly - likely low sulfur, high TAN, heavy crudes.
  - Imports from Canada and West Africa are assumed to be minimal.
    - Shipping logistics assumed to impact such imports.
    - Could replace part of Middle East imports if shipping issues can be addressed.

Northern California - Observations (continued)

- **ANS use will decline at a slower rate than in Southern California.**
  - Apparent resistance to change.
    - ChevronTexaco, Richmond will likely be more receptive to substitution.
    - Other ANS users could be concerned about shipping logistics and/or additional desulfurization requirements.
  - ANS use will be eliminated in 2018.
- **California crudes will continue to play a significant role - 200 MB/D in 2019.**

Central California Crude Oil Supply



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Impact of Alternative Fuel Vehicles - Projections

- **US DOE *2005 Annual Energy Outlook* projections for the Pacific region:**
  - The Pacific region comprises California, Washington, Oregon, Alaska, and Hawaii.
  - Regional (CA is about 75%) total transportation fuel demand will increase about 1.9% on annual average basis to 2020.
  - DOE projections incorporate the expected growth in alternative fuel vehicle (AFV) sales and increased mileage efficiency.
  - New car sales of AFVs are increasing, but will be only 14% of total new car sales by 2020.
  - Hydrogen fuel cell vehicles are projected to account for only 0.01% of vehicle population by 2020.
  - Traditional gasoline and diesel powered vehicles currently make up over 97% of total vehicle population; this will only be lowered to 89% by 2020.

Total U.S. Vehicle Market Shares By Class, 1980-2003

Sales Period	Percent Unless Specified					
	1980	1985	1990	1995	2000	2003
Vehicle						
Minicompact	3.8	0.3	0.6	0.3	0.1	0.5
Subcompact	30.4	15.7	14.8	10.4	10.4	2.8
Compact	5.3	23.2	23.0	22.4	13.9	18.5
Midsize	27.2	20.5	18.3	17.0	19.4	16.1
Large	11.8	10.0	9.3	9.0	7.5	8.3
Two Seater	1.9	2.5	1.2	0.4	0.7	1.0
Small Pickup	4.6	5.7	8.3	7.3	6.2	4.6
Large Pickup	9.9	11.1	8.1	10.0	11.4	12.7
Small Van	0.1	2.9	7.4	8.6	7.4	6.5
Large Van	2.9	3.5	2.3	2.8	2.1	2.0
Small Utility	0.5	2.9	2.9	3.5	4.4	5.2
Medium Utility	1.3	1.2	3.2	7.3	12.5	16.5
Large Utility	0.3	0.5	0.7	1.0	4.1	5.3
Total Light Vehicles Sold, Millions	**11.3**	**15.2**	**13.7**	**14.7**	**17.3**	**16.3**
Cars, %	**80.4**	**72.1**	**67.1**	**59.5**	**51.9**	**47.2**
Light Trucks, %	**19.6**	**27.9**	**32.9**	**40.5**	**48.1**	**52.8**

Source: Oak Ridge National Laboratory, Light Vehicle MPG and Market Shares System, Oak Ridge, TN, 2004.
www-cta.ornl.gov

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Impact of Alternative Fuel Vehicles - Conclusions

- **The growth in alternative fuel vehicle sales will be counteracted in part by the continued growth in sales of sport utility vehicles and thereby not significantly slow the growth in demand for transportation fuels.**

- **DOE's projected refined product demand growth of 1.9%, coupled with our projected refinery capacity growth of about 1.6%, indicates that alternative fuel vehicles will have no significant impact on our projected crude import requirements for California.**

- **Additionally, the elimination of oxygenate requirement for CARB gasoline could increase gasoline supply deficit by about 65 MB/D if ethanol is removed.**

Crude TAN Issues

- **Acidity of crude, referred to as Total Acid Number (TAN), is measured as the milligrams of potassium hydroxide (KOH) needed to neutralize one gram of crude.**
- **For most refineries, a TAN above 1.0 is generally considered to be a corrosion problem in distillation columns made of carbon steel.**
  - High TAN crudes require stainless steel cladding of columns and piping.
  - Chemical treatment is possible, but costly, and effectiveness must be closely monitored to avoid mechanical damage.

Crude TAN Issues (continued)

- **TAN has emerged as an important factor in worldwide refiners' ability to process crude oils.**
  - New high TAN crudes are being produced in West Africa, China, Canada, and Venezuela.
  - Production of these high TAN crudes is expected to increase significantly over the next few years.
  - Limited worldwide refinery capacity exists to handle these crudes.
  - Potential "quality discounts" for refiners equipped to handle high TAN crudes.
  - California refiners are well positioned to exploit this opportunity.

California Refineries - High TAN Crude Capability

- **Historically, most of California's crude production is high TAN.**
  - TAN levels are comparable to those of new high TAN crudes produced for world markets.
- **As a result, much of California's refining capacity is already configured to handle high TAN crudes.**
  - Southern: 62%
  - Northern: 49%
  - Central: 100%
- **West African and Chinese high TAN crudes are low in sulfur content, which would be advantageous to California refiners.**

Examples of Relevant High TAN Crudes

	REGION					
	California		Canada	Pacific Rim	West Africa	
CRUDE	Kern	Wilmington	"Syn-Bit"	Peng Lai (China)	Doba (Chad)	Kuito (Angola)
Gravity, °API	13	19	19	22	20	19
Sulfur, WT%	1.2	1.6	3.0 – 3.5	0.3	0.2	0.7
Acid Number (TAN), mg. KOH/gm.	3.1	2.2	2 – 3	2.6	4.0 – 4.8	2.1

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Limitations

The information contained in this study was developed based on information available to us at the time this study was prepared. Analysis, data, and conclusions are limited by the assumptions stated herein and any other specific limitations noted. We relied on the veracity of publicly available information and other non-confidential information unless we had specific reason to doubt it.

Baker & O'Brien's compensation for this work was not, and is not, contingent upon any transaction, contract execution, or estimate of value that might favor the cause of Pacific Energy Group LLC, their subsidiaries, or any other party.

We reserve the right to amend and/or supplement this study in the event that additional information, valid at the time this study was issued, becomes available in the future.